Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	EVOLUCIJA
Course title:	EVOLUTION

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enoviti pedagoški magistrski program 2. stopnje Predmetni učitelj	**Izobraževalna biologija**	**5.**	**9**
	Educational Biology	**5**	**9**

Vrsta predmeta / Course type Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30					**60**	**3**

Nosilec predmeta / Lecturer: Peter KOZEL

Jeziki / Languages:	
Predavanja / Lectures:	slovenski Slovenian
Vaje / Tutorial:	slovenski/Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Jih ni.

Prerequisits:

None.

Vsebina:

I. Evolucija kot znanost
- položaj evolucije v kontekstu naravoslovnih, družbenih in humanističnih znanosti;
- zgodovinski razvoj evolucijske misli;
- sodobni pogledi na proces evolucije;

II. Izvor živega
- prebiotska evolucija;
- teorije o nastanku živega;
- veliki evolucijski prehodi;
- kraljestva in domene živega;

III. Orodja evolucijskega biologa
- paleontološki izkazi (fosili, posledice delovanja);

Content (Syllabus outline):

I. Evolution as science
- evolution in the context of sciences, social sciences and humanities;
- history of evolutionary thinking;
- recent views on evolution;

II. Emergence of life
- prebiotic evolution;
- theories on development of life;
- major evolutionary transitions;
- kingdoms and domains of life;

III. Tools of evolutionary biologist
- paleontology (fosils, traces of biological activities);

- datacija najdb;
- primerjalne študije (anatomske, histološke, embriološke, biokemijske, genetske);
- genske analize;
- kladistične analize;

IV. Izvori genske pestrosti

- razmerje med genomom, genotipom in fenotipom;
- mutacije;
- genske rekombinacije;
- horizontalni genski transfer;
- epigenetsko dedovanje;
- populacijska genetika;

V. Selekcija

- dejavniki selekcije;
- prijemališča selekcije;
- strategije preživetja;
- primeri adaptacij na okolje;
- koevolucija;

VI. Speciacija in razvoj višjih taksonov

- opredelitev koncepta vrste (biološka, morfološka, kronološka);
- reproduktivna izolacija;
- speciacija (alopatrična, simpatrična, parapatrična);
- razvoj višjih taksonov;
- izumrtje taksona;

VII. Humana evolucija

- izvor in evolucija primatov;
- evolucija primatskih znakov;
- povezava med biološko in kulturno evolucijo;
- filogenija in sistematika recentnih družin primatov;
- filogenija, sistematika in biogeografija predhodnikov in sodobnikov rodu Homo (Ardipithecus, Paranthropus, Australopithecus, itd.);
- filogenija, sistematika in biogeografija rodu Homo;
- izvor, filogenija, sistematika in biogeografija vrste *Homo sapiens*;
- razvoj človeških kultur;
- najdbe v Sloveniji;
- evolucijske perspektive vrste *H. sapiens.*

- datation;
- comparative studies (anatomy, histology, embriology, biochemy, genetics);
- gen analyses;
- kladistic analyses

IV. Sources of genetical variability

- relations between genome, genotype and phenotype;
- mutations;
- genetic recombinations;
- horizontal gene transfer;
- epigenetic inheritance;
- population genetics

V. Selection

- factors of selection;
- targets of selection;
- survival strategies;
- adaptations;
- coevolution;

VI. Speciation and evolution of higher taxa

- species concept (biological, morphological, chronological);
- reproductive isolation;
- speciation (alopatric, simpatric, parapatric);
- development of higher taxa;
- extinction of taxa;

VII. Human evolution

- evolution of primates;
- evolution of traits in primates;
- connections between biological and cultural evolution;
- phylogeny, systematics and biogeography of recent primate families;
- phylogeny, systematics and biogeography of human precedesors and side branches of the human evolutionary line (Ardipithecus, Paranthropus, Australopithecus, Paranthropus, etc.);
- phylogeny, systematics and biogeography of the genus Homo;
- phylogeny, systematics and biogeography of the species *Homo sapiens*;
- evolution of culture;
- Slovenian findings;
  evolutionary perspectives of *H. sapiens.*

Temeljni literatura in viri / Readings:

Hopcroft, R. L. (2018). *The Oxford Handbook of Evolution, Biology, and Society*. Oxford University Press.

Futuyma, D. J. in Kirkpatrick, M. (2017) *Evolution, 4th edition*. Sunderland (Massachusetts), Sinauer Associates.

BAJD, B. (2010). *Where did we come from? : current views on human evolution*. Ljubljana, Faculty of Education. 170 str.

Jablonka, E. in Lamb, M. J. (2009) *Štiri razsežnosti evolucije. Genetska, epigenetska, vedênjska in simbolna raznolikost v zgodovini življenja*. Zavod RS za šolstvo. 444 str.
Mayr, E., Diamond, J. M., Simoniti, I., Weber, A. in Wilkins, J. S. (2008) *Filozofija evolucije*. Fakulteta za družbene vede. Univerza v Ljubljani. 366 str.
McGrew, W. C. (2011) *Kulturni šimpanz. Razmišljanja o kulturni primatologiji*. Studia Humanitatis. Ljubljana. 401 str.
Izbrani članki iz primarnih revij (Nature, Science, itd.)

Cilji in kompetence:

- Razumevanje mehanizmov biotske evolucije,
- pridobivanje znanj o izvoru in razvoju živega na osnovi spoznanj naravoslovnih znanosti,
- prepoznavanje evolucijskih procesov v kontekstu drugih bioloških disciplin,
- prepoznavanje in utemeljevanje biotske in kulturne evolucije,
- umeščanje človeka v biološki sistem in
- opredeljevanje človeka kot biotsko in kulturno bitje.

Objectives and competences:

- Understanding of mechanisms of biotic evolution,
- gaining knowledge about the origin and evolution of life based on the natural sciences,
- recognition of evolutionary processes in the context of other biological disciplines,
- recognition and foundation of biotic and cultural evolution,
- classification of the human being into a biological system and
- definition of human as a biological and cultural being.

Predvideni študijski rezultati:

Študenti poznajo odnos med znanostjo in drugimi družbenih vednosti. Pojasnijo procese nastanka in razvoja neživega in živega. Naštejejo različna orodja evolucijskega biologa in njihovo uporabo. Znajo pojasniti vzroke raznolikosti živih bitij, mehanizme selekcije, speciacije in razvoja višjih taksonov. Pridobijo poglobljeno znanje o kozmogoniji, kemoevoluciji, biotski in humani evoluciji, kar jim omogoča vključevanje v razprave o evolucijskih tematikah.

Intended learning outcomes:

Students know the relationship between science and other social disciplines. They explain processes of origin and evolution of non-living and living things. They list different tools of an evolutionary biologist and their applications. Students are able to explain the souces of diversity of living beings,mechanisms of selection, speciation and development of higher taxa. They acquire detailed knowledge of cosmogony, chemoevolution, biotic and human evolution, which enables them to participate in discussions about evolution.

Metode poučevanja in učenja:

Predavanja
Samostojno kritično preučevanje literature

Learning and teaching methods:

Lectures
Individual critical reading of the written sources.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Pisni izpit	**100 %**	Written exam

Reference nosilca / Lecturer's references:

Kozel, P., Delić, T. in Novak, T. (2020) *Nemaspela borkoae* sp. nov. (Opiliones: Nemastomatidae), the second species of the genus from the Dinaric Karst. European Journal of Taxonomy, 717: 90-107. doi: 10.5852/ejt.2020.717.1103.

Kozel, P., Pipan, T., Mammola, S., Culver, D. C. in Novak, T. (2019) Distributional dynamics of a specialized subterranean community oppose the classical understanding of the preferred subterranean habitats. Invertebrate biology, 138(3): 1-14. doi: 10.1111/ivb.12254.

Pipan, T., Culver, D. C., Papi, F. in Kozel, P. (2018) Partitioning diversity in subterranean invertebrates: the epikarst fauna of Slovenia. PloS ONE, 13(5): 1-19. doi: 10.1371/journal.pone.0195991.

Kozel, P. in Pipan, T. (2020) Specialized aquatic subterranean communities are probably most species-rich in the thickest epikarst. Limnologica, 81: 1-9. doi: 10.1016/j.limno.2020.125756.

Novak, T., Slana Novak, L., Kozel, P., Schaider, M., Komposch, C., Lipovšek, S., Podlesnik, J., Paušič, I. in Raspotnig, G. (2021) Hidden diversity within the *Nemastoma bidentatum* Roewer, 1914 complex (Opiliones: Nemastomatidae). Part I, Morphological evidence. European Journal of Taxonomy, 777: 1-67. doi: 10.5852/ejt.2021.777.1561.